E&A R

Vol. 8. Part 2. Pp. 17-32. 15th February, 1939.

THE PROCEEDINGS

OF THE

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

IMP. INST. ENT. — LIB. — 15 FEB 1939 — E. 344 B — ERIAL EPARATE

Series B.
TAXONOMY
(being the continuation of Stylops)

World List abbreviation: *Proc. R. ent. Soc. Lond.* (B)

CONTENTS

	PAGE
CORBET, A. Steven, D.Sc., Ph.D., F.R.E.S. A revision of the Malayan species of *Miletus* Hübner (= *Gerydus* Boisduval) (Lepidoptera: LYCAENIDAE)	25–31, 19 figs.
EDWARDS, F. W., M.A., Sc.D., F.R.E.S. A new East African *Aëdes* (Dipt., CULICIDAE)	17, 1 fig.
FRASER, Lt.-Col. F. C., I.M.S. Retd., F.R.E.S. A note on the generic characters of *Ictinogomphus* Cowley (Odonata)	21–23, 3 figs.
FRASER, Lt.-Col. F. C., I.M.S. Retd., F.R.E.S. *Libellago adami*, a new species of dragonfly from Ceylon (Odonata)	23–24, 1 fig.
GARDNER, J. C. M., F.R.E.S. The larva of *Anthia sexguttata* (Fab.) (Coleopt. CARABIDAE)	18–20, 6 figs.
MACDONALD (Miss) E. C. The larva of *Aëdes* (*Finlaya*) *pulchrithorax* Edwards (Dipt., CULICIDAE)	17–18
BOOK NOTICES	32

LONDON:
PUBLISHED BY THE SOCIETY AND
SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W.7

Price 3s. 0d.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Founded, 1833. Incorporated by Royal Charter, 1885.

PATRON—HIS MAJESTY THE KING.

OFFICERS and COUNCIL for the SESSION, 1938–1939.

J. C. F. Fryer, O.B.E., M.A., *President.*

H. M. Edelsten
A. D. Imms, M.A., Sc.D., F.R.S.
H. Willoughby Ellis, M.I.E.E. } *Vice-Presidents.*

Francis Hemming, C.M.G., C.B.E., *Treasurer.*

O. W. Richards, M.A., D.Sc., *Secretary.*

F. J. Griffin, A.L.A., *Registrar.*

Other Members of Council.

R. B. Benson, M.A.
Brig.-Gen. B. H. Cooke, C.M.G., C.B.E., D.S.O.
C. N. Hawkins.
L. G. Higgins, M.A., F.R.C.S.
B. M. Hobby, M.A., D.Phil.
Sir Guy A. K. Marshall, C.M.G., D.Sc., F.R.S.
N. D. Riley.
W. H. T. Tams.
W. R. Thompson, Ph.D., D.Sc., F.R.S.
B. P. Uvarov, D.Sc.
V. B. Wigglesworth, M.A., B.Ch., M.D.

Trustees of the Society.

R. W. Lloyd.
Sir Edward B. Poulton, F.R.S.

Finance and House Committee.

H. Willoughby Ellis, M.I.E.E. (Chairman).
Prof. P. A. Buxton, M.A.
Brig.-Gen. B. H. Cooke, C.M.G., C.B.E., D.S.O.
G. Fox-Wilson.
C. N. Hawkins.
R. W. Lloyd.

Publication Committee.

W. R. Thompson, Ph.D., D.Sc., F.R.S. (Chairman).
H. E. Andrewes.
M. Burr, D.Sc., F.G.S., A.R.S.M.
B. M. Hobby, M.A., D.Phil.
N. D. Riley.
V. B. Wigglesworth, M.A., B.Ch., M.D.

Library Committee.

R. B. Benson, M.A. (Chairman).
E. A. Cockayne, M.A., M.D., F.R.C.P.
H. M. Edelsten.
B. M. Hobby, M.A., D.Phil.
W. H. T. Tams.
B. P. Uvarov, D.Sc.

Committee for the Protection of British Insects.

W. G. Sheldon (Chairman).
Capt. E. Bagwell-Purefoy.
C. L. Collenette.
W. J. Dow.
J. C. F. Fryer, O.B.E., M.A.
Col. F. A. Labouchere.
N. D. Riley.
H. M. Edelsten (Secretary).

The Executive Officers of the Society are *ex-officio* members of all Committees.

DELEGATES OF THE SOCIETY TO:

1. **British National Committee for Biology** (Royal Society).
   Sir Thomas Hudson Beare, LL.D., F.R.S.E., appointed 1933.
   Dr. Karl Jordan, F.R.S., appointed 1936.
2. **Conference of Delegates of Corresponding Societies of the British Association for the Advancement of Science.**
   Sir Edward Poulton, F.R.S., appointed 1937.
3. **International Congress of Entomology** (Berlin 1938).
   J. C. F. Fryer, O.B.E., M.A. *Francis Hemming, C.M.G., C.B.E.*
   A. D. Imms, M.A., Sc.D., F.R.S.
4. **Local Committee of Management of Wicken Fen.**
   Mr. H. M. Edelsten. *Mr. E. C. Bedwell.*
   [Delegates nominated by Committee for the Protection of British Insects.]
5. **National Trust for Places of Historic Interest or Natural Beauty.**
   Mr. W. G. Sheldon, appointed 1922.
6. **New Forest Association.**
   Mr. W. Fassnidge, appointed 1934.
7. **Royal Meteorological Society. Phenological Committee.**
   Dr. C. B. Williams, appointed 1937.

A NEW EAST AFRICAN *AËDES* (DIPT., CULICIDAE)

By F. W. Edwards, M.A., Sc.D., F.R.E.S.

Aëdes (Finlaya) pulchrithorax sp. n.

An extremely distinctive species, with markings much as in *A. barnardi* Edwards, but much more sharply defined and contrasted black and white; differs from *A. barnardi* and related African species of the subgenus *Finlaya* in having hind femur black at base and hind tibia white at base beneath, and in several other details. Mesonotum black, with three rather narrow straight lines of narrow yellowish-white scales, median line running whole length and forking in front of scutellum. Anterior and posterior pronotal lobes with flat silvery-white scales. Abdomen black, segments with silvery-white lateral basal spots. Tarsal markings as in the *A. wellmani* group.

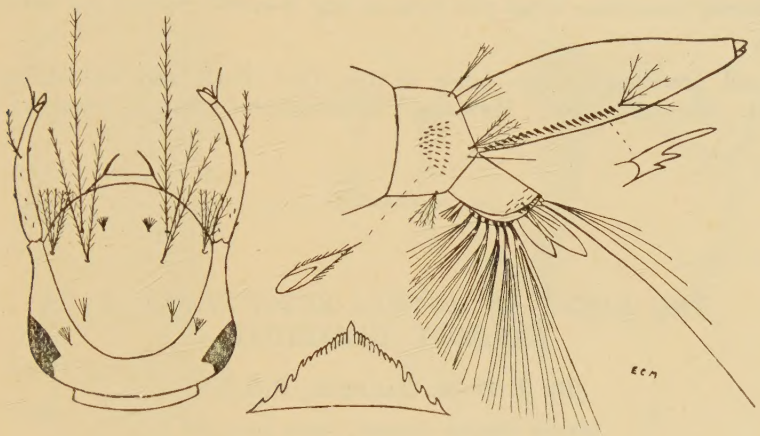


Fig. 1.—*Aëdes* (*Finlaya*) *pulchrithorax* sp. n.

Kenya: Nairobi (*Miss E. C. Macdonald*).

Types presented by the collector to the British Museum.

The thoracic markings are strikingly similar to those of *Culex pulchrithorax* Edw. A fuller description and figure will be given in my forthcoming monograph of the Ethiopian Culicine mosquitoes.

THE LARVA OF *AËDES* (*FINLAYA*) *PULCHRITHORAX* EDWARDS (DIPT., CULICIDAE)

By (Miss) E. C. Macdonald.

(*The Medical Research Laboratory, Nairobi.*)

Described from 20 pelts and 12 whole larvae.

Length 6 mm. Colour dark; head and siphon very dark.

Head. Antenna infuscate throughout its length and sparsely spiculate. Tuft a single or two branched, fairly long, finely plumose seta placed just beyond a half. Seta A with

4–6, usually 5, finely plumose branches about half the length of C; B a single finely plumose seta about the length of the head; C 2–3 branches, usually 2, finely plumose, nearly two-thirds B and placed slightly internal and very close to B and almost in a line with A. d small, many branched and placed in a line with B. e with 4–5 branches slightly longer than f which has 10–15 branches. Mentum with 13 teeth on each side of a large central tooth and increasing in width of spacing towards the base.

Abdomen. Comb a semi-circular patch of 24–29 finely fringed, sharp pointed spines. Siphon very dark with an index of about 4. Pecten composed of 20–25 dark, well-sclerotised spines none of which is markedly wider spaced and reaching to a little beyond a half. Each individual spine with 2–3 basal denticles. Subventral tuft of 4–5 sparsely plumose branches about the length of the diameter of the siphon and placed just beyond the pecten. Anal segment with almost complete saddle; the upper distal margin with small spicules. Upper caudal seta with 4–6 branches, usually 4, and the lower single. Lateral seta with 4–6 simple branches, much shorter than the saddle. Brush composed of 6 pairs of tufts with 4–7 simple branches. Two small tufts outside the barred area. Gills short, bluntly lanceolate; dorsal pair about as long as saddle; ventral pair considerably shorter.

Found breeding in tree holes in the City Park and the Arboretum, Nairobi. The trees were " Mutanga " (*Elaeodendron* sp.) and *Linociera* sp.

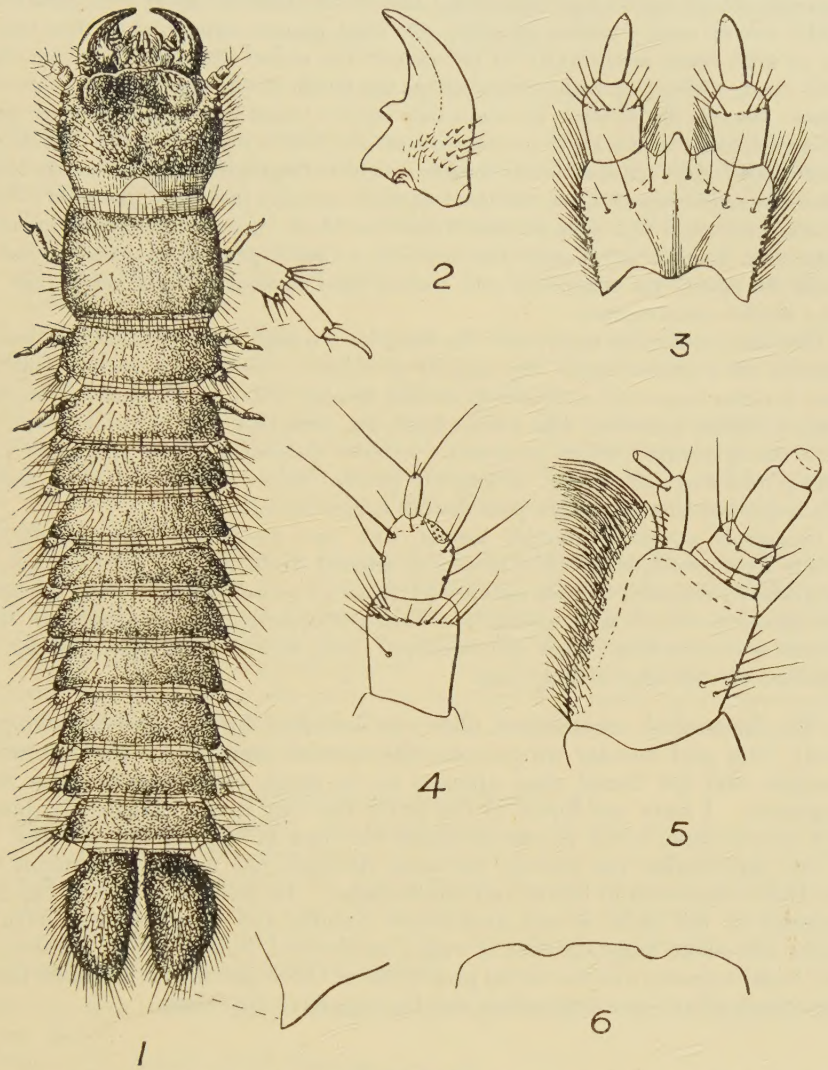
THE LARVA OF *ANTHIA SEXGUTTATA* (FAB.) (COLEOPT. CARABIDAE)

By J. C. M. Gardner, F.R.E.S.

(*Forest Research Institute, Dehra Dun, U.P.*)

The larva of *Anthia* was unknown until Chopard and Jeannel recently succeeded in rearing *Anthia sexmaculata* (Fab.), an Algerian species, after years of failure. Chopard (1) gave an excellent illustrated description, and Jeannel (2) comments on certain peculiarities, of the larva. Later, van Emden (3) discussed those two papers and indicated the diagnostic characters of the Anthiini.

The discovery of the larva of another species, *Anthia sexguttata* (Fab.), is of interest in the circumstances. In 1938, a field party from the Forest Research Institute under Mr. R. N. Mathur was engaged in investigating defoliation problems in the plantations of *Dalbergia sissoo* in the sandy areas of Chichawatni, Punjab. Among the miscellaneous insects collected were numerous (about 100) adults of *Anthia sexguttata* and four carabid larvae which show all the generic and tribal characters indicated by Chopard and by van Emden. There can be little doubt that larvae and adults are of the same species. Efforts had been made to rear the larvae but on their death they had been preserved in alcohol. The larvae were in fairly good condition, but rather distorted and probably discoloured. Three larvae are about 25 mm. in length; the fourth was in pre-pupal condition and about 35 mm. in length, smaller than would be expected in relation to the size of the adult; the discrepancy is probably due to the artificial conditions in which the larva had been kept before its death.



FIGS. 1–6.—*Anthia sexguttata* (Fab.) larva. 1, larva in dorsal view (part of leg and apex of urogomphus shown enlarged); 2, mandible; 3, labium in ventral view; 4, antenna; 5, maxilla; 6, anterior margin of frontal plate.

Head and urogomphi black; pronotum dark castaneous, the following terga castaneous (reddish testaceous in one of the smaller specimens); ventro-lateral projections from mesothorax to eighth abdominal segment castaneous; undersurface pale with testaceous plates; the two posterior sterna with larger and darker plates; setae dark reddish. Body nearly parallel-sided, moderately depressed.

Head wider than long, with a shallow transverse groove before the basal emargination; anterior to this groove is a transverse series of erect setae, laterally are numerous rather long setae each arising from a basal granule; epicranial suture distinct. Six ocelli on each side. Frontal plate depressed medially, the anterior margin (fig. 6) with a wide, weakly produced nasale with nearly straight edge. Antenna (fig. 4) three-segmented, black;

basal segment not much longer than wide; the second about as long as wide, with a large slightly convex sensory cushion apically; the third segment slender, more than twice as long as wide, borne eccentrically on the apex of the second segment. Mandible (fig. 2) rather stout, with stout tooth a little behind the middle; with numerous setae on outer surface. Maxilla (fig. 5) black, the stipes only slightly longer than wide; the inner margin produced apically into a stout continuous lobe and with a dense fringe of reddish setae for its whole length; galea with two elongate articulated segments, the basal one the longer; palp stout, four-segmented, the two basal segments strongly transverse, the third cylindrical, distinctly longer than wide, the fourth short and blunt. Labium (fig. 3) with prominent ligula which bears no apical setae (but there are two small setae on its dorsal surface well behind the apex); the palps each with a stout basal segment, slightly longer than wide and a slender apical segment.

Pronotum moderately transverse; the following ten terga strongly transverse, rounded laterally, the posterior angles very slightly prominent; each with a posterior marginal series of rather longer stiff setae as well as some anterior setae. Each segment from mesothorax to eighth abdominal with a stout finger-like projection, with numerous setae, from below the spiracular level on each side. Anterior abdominal sterna with small plates bearing numerous rather long, backwardly directed setae; eighth and ninth sternum with large transverse plates, the posterior one curved behind.

Urogomphi separately movable basally, with rigid integument; approximate; extremely stout, ovoid, about twice as long as greatest width, slightly constricted at base and gradually narrowed towards the apex which carries a small distinct tooth; the surface with numerous reddish setae arising from basal granulations; the urogomphi are almost circular in cross-section. Legs well developed, each with a single rather slender claw which has two fine setae near the base.

The larva of *A. sexmaculata* (Fab.) as described by Chopard has comparatively long and slender urogomphi, the second segment of the antenna is elongate and the tarsal claw appears to be much more slender than in *A. sexguttata*. I have not found in the latter the long seta, regarded by Jeannel as a second claw, which is present above the claw in the Algerian species.

As van Emden has shown, the tribe Anthiini has much in common with the Helluonini both in larval and adult stages. In Helluonini larvae the basal segment of the galea is not articulated basally and is continuous with the stipes (its shape suggests that it might be derived from a fusion between the free basal segment and the distal projection of the stipes in the Anthiine larva); the antennae are four segmented and the legs have two claws.

References.

(1) 1936, La larve de l'*Anthia sexmaculata* F. *Bull. Soc. ent. Fr.* **41** : 168–173, 10 figs.

(2) 1936, Les caractères larvaires des *Anthia* Weber. *Bull. Soc. ent. Fr.* **41** : 174–176.

(3) 1937, On the larval characters of *Anthia*. *Ent. mon. Mag.* **73** : 58–61.

A NOTE ON THE GENERIC CHARACTERS OF *ICTINOGOMPHUS* COWLEY (ODONATA)

By Lt.-Col. F. C. Fraser, I.M.S. Retd., F.R.E.S.

Under the old Selysian classification, *Ictinus* (= *Ictinogomphus* Cowley) was treated as a subgenus of genus *Lindenia*, and was divided up into three Groups —*decoratus*, *clavatus* and *ferox*. For this latter purpose, colour differences were mainly employed, that is, the relative preponderance of the black ground colour and the yellow markings. Some venational characters in one group and the armature of the female occiput in the others were also employed but in a subsidiary sense.

A division based on colour differences, which were more of a specific than generic nature, was not altogether satisfactory, and the need for more decisive definitions has since been stressed by several authors.

Hagen, in 1857, *Monographie des Gomphines*, gave short descriptions and moderately good figures of the genitalia of Groups *decoratus* and *clavatus*, but for some unexplained reason, which may have arisen from a desire not to tamper with the unique specimen from the Paris Museum, failed to give that of the third Group *ferox*.

Recently, whilst engaged in an examination of the genitalia throughout the whole family Gomphidae, my attention has been called to the wide differences existing between the penes of these three Groups; so wide, in fact, that no modern systematist would hesitate in coming to the conclusion that he was here dealing with three separate genera. For establishing three such genera, I propose here to employ the genitalia, together with some other anatomical and venational differences, which have been found by a comparison of the various species of the genus *Ictinogomphus*.

Ictinogomphus Cowley (fig. A).

A genus of very robust species; subtriangle made up of 3 cells, very rarely, and then abnormally, of 2 cells (in only one specimen of *I. ferox* have I found a subtriangle of 2 cells); discoidal field with 2 or 3 rows of cells, usually 3 rows; anal-loop made up of 5 to 6 cells; tornal angle produced, its sides enclosing an acute angle; lateral borders of segment 8 enormously dilated. Penis with first and second segments of equal length; glans short, with ventral spine but without terminal flagella.

Distribution : Ethiopian. Includes two species only, *ferox* (Rambur) and *pugnax* (Selys).

Genotype : *Ictinus ferox* Rambur.

Indictinogomphus gen. n. (fig. C).

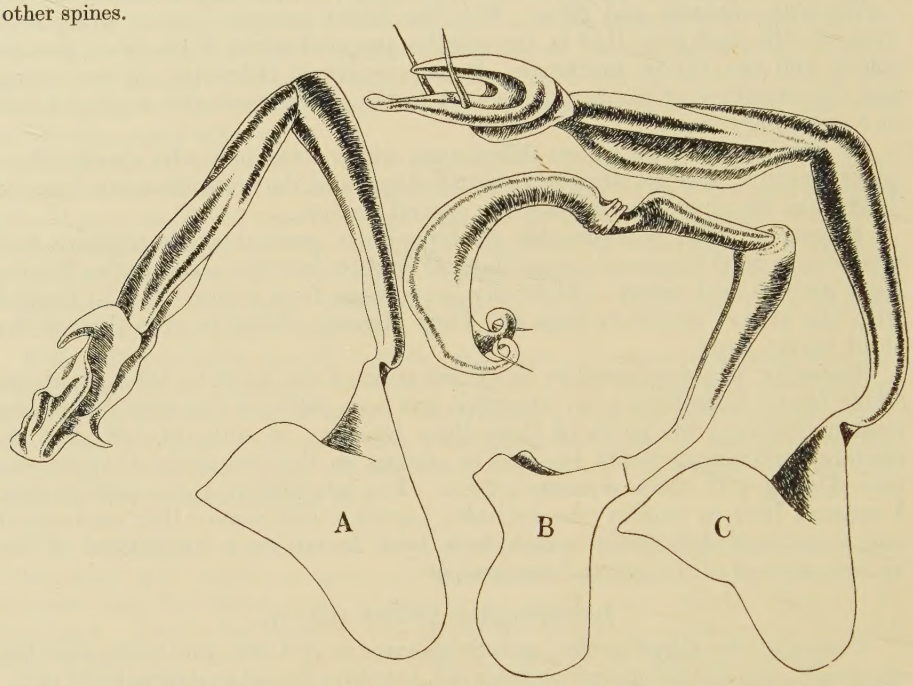
A genus of less robust species; subtriangle made up of 2 cells only; discoidal field with only 2 rows of cells; anal-loop made up of 4 cells only; tornal angle not produced, its sides enclosing a right or slightly obtuse angle; lateral borders of segment 8 only moderately dilated. Penis with first and second segments of equal length; glans short, without a ventral spine or terminal flagella, deeply fissured horizontally and with two long divaricate spines springing from the lower lip of the fissure.

Distribution : Oriental, from India to the Philippines and throughout the Sondaic archipelago to as far as Borneo and Australia. Includes *rapax* (Rambur), *fallax* (Selys), *tenax* (Selys), *annulosus* (Selys), *atrox* (Selys), *pertinax* (Selys), *decoratus* (Selys), *melanops* (Selys), *acutus* (Laidlaw), *australis* (Selys) and *celebensis* (Schmidt).

Genotype : *Diastatomma rapax* Rambur.

Sinictinogomphus gen. n. (fig. B).

A genus consisting of one very robust species with the subtriangle made up of only 2 cells; discoidal field with only 2 rows of cells; anal-loop made up of 3 cells only; tornal angle not produced, its sides enclosing a slightly obtuse angle; lateral borders of segment 8 enormously dilated. Penis with second segment only half the length of first; glans of great length, bifurcated at apex and ending in two long coiled flagella, without ventral or other spines.



Figs. A–C.—Penile organs of: A. *Ictinogomphus ferox* (Rambur); B. *Sinictinogomphus clavatus* (Fabr.); C. *Indictinogomphus rapax* (Rambur).

Distribution: East and south-east Asia. Includes only a single species *clavatus* (Fabr.). *I. phaleratus* Kirby is here considered an undoubted synonym of the former.

Genotype: *Aeshna clavatus* Fabr.

In 1934, *Fauna of British India, Odonata*, **2**: 370, I placed the two genera *Ictinus* and *Gomphidia* Selys in a new subfamily which I called Ictininae, but since Cowley has shown that the name *Ictinus* is preoccupied and has renamed *Ictinus*, this subfamily now becomes Ictinogomphinae and will include the genera *Ictinogomphus*, *Indictinogomphus*, *Sinictinogomphus*, *Gomphidia* and *Cacus*.

Ictinogomphus and *Gomphidia* approach each other in the two species *I. tenax* (Selys) and *G. kirschii* Selys. *I. tenax* is an aberrant species and is remarkable for possessing an inferior anal appendage with the branches parallel instead of divergent as in the rest of the genus, except *I. celebensis* (Schmidt). The lateral expansions on the sides of segment 8 are very poorly developed and approach the condition found in *Gomphidia*. In *G. kirschii* the superior anal appendages are subcylindrical as in *Ictinogomphus* and thus differ from other species in the genus in which they are compressed. It is a coincidence

that these two aberrant and converging species should both be restricted to the Philippines and it suggests hybridism. I have not had the opportunity of studying the penis of *I. tenax*, but that of *G. kirschii* I find to be typical for *Gomphidia*. It may become necessary to erect a new genus for the two species *I. tenax* and *I. celebensis*.

LIBELLAGO ADAMI, A NEW SPECIES OF DRAGONFLY FROM CEYLON (ODONATA)

By Lt.-Col. F. C. Fraser, I.M.S. Retd., F.R.E.S.

Among a large number of specimens of *Libellago* which I collected in Ceylon in 1932, I find a single male which is evidently closely allied to *L. lineata asiatica* Fraser, but which bears the general colouring and facies of *L. finalis* Selys, although considerably smaller. This species, which is undoubtedly new,

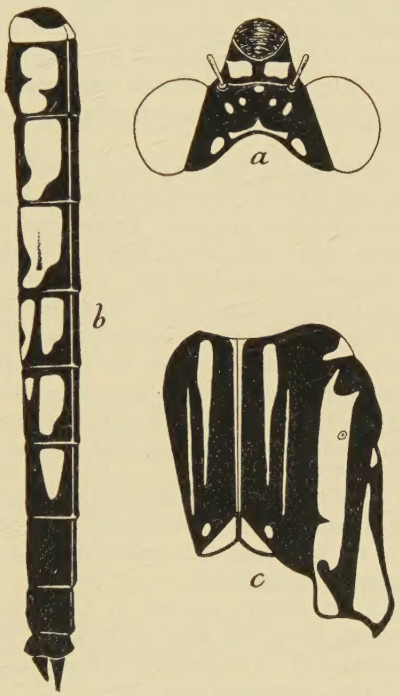


Fig. 1.—*Libellago adami* sp. n., a. Head, b. Latero-dorsal view of abdomen, c. Dorsum and right side of thorax to show markings.

now brings the number belonging to genus *Libellago*, found in Ceylon, to four, in contrast to only a single species for the whole of continental India. This striking development of *Libellago* in the island, is paralleled to an even greater degree by the Platystictidae, and is a typical insular character. If, as is to be suspected, the whole of the Ceylon Libellagos have originated from the

widely distributed species *L. lineata lineata* (Burm.), then, judging from the wide differentiation attained by the various species, the separation of the island from the main continental mass of India must be of a greater age than was suspected.

Libellago adami sp. n.

Male : abdomen 14 mm. Hind-wing 18 mm.

Head : labium a dirty yellow; labrum glossy black; eyes olivaceous clouded in parts with brown, this latter with a violet reflection. Rest of head velvety black marked with citron yellow as follows : the genae and a short stripe running up on the inner sides of the eyes, two very large reniform spots on the frons, a small rounded spot on the outer side of the ocellar area, a large oval spot on each side of the occiput, narrowly separated from a stripe which runs between them and sends a small point forwards at its centre.

Prothorax velvety black marked with a narrow citron yellow collar anteriorly, a large rounded spot on each side and an oval spot on the summit of the posterior lobe, which latter is clothed with long hairs. Thorax velvety black marked with citron yellow as follows : the mid-dorsal carina finely, an antehumeral stripe which is incomplete above and broadens rather abruptly below, a fine humeral line incomplete above and below, the alar sinus and a small rounded spot in front of each outer angle, a broad, irregular fascia on the mesepimeron and the greater part of the metepimeron. Legs black, femora chalky-white on the under surfaces.

Wings hyaline but the apices of the fore-wings very broadly tipped with black, which has a steely-blue reflection and extends proximally to well inside the end of pterostigma of hind-wing, when the two wings are apposed. Pterostigma present only in the hind-wings, black, covering 3 cells. Hind-wing tinted with yellow, this colour deepest at base and gradually fading out towards the apex of wing. Antenodal nervures 6 and 5 in fore- and hind-wings, 10 to 11 postnodals in hind-wing. Petiolation in fore-wing well proximal of level of basal antenodal, but only slightly so thereof in the hind-wing.

Abdomen velvety black, with markings, which are a beautiful grass-green on dorsum and golden-yellow laterally, on segments 1 to 7 shaped as shown in the accompanying text-figure, and closely copying the same markings in *L. lineata asiatica* Fraser.

Anal appendages black, not differing from those of *L. lineata lineata* (Burm.).

Habitat : A single male Ceylon : Harigama, 7.v.32, the type, now in my collection. The specimen was taken in company with *L. greeni* Laid., and *L. finalis* Selys, all perched on the ends of twigs overhanging a mountain stream. The species is named after Adams Peak.

This new species is most closely related to *L. lineata asiatica*, a common species throughout southern India but rare in Ceylon. It is to be distinguished from it by the much broader apical marking of fore-wings and by the brilliant grass-green colouring of the dorsum of abdomen.

From *L. greeni*, the colour of the abdominal markings will at once distinguish it, these being bright brick-red in *L. greeni*.

From *L. finalis*, which is a much larger species, it is distinguished by the much broader head markings, by the humeral stripe incomplete above and by the colour of the hind-wings, which are evenly and rather deeply enfumed throughout in *L. finalis*.

A REVISION OF THE MALAYAN SPECIES OF *MILETUS* HÜBNER (= *GERYDUS* BOISDUVAL) (LEPIDOPTERA: LYCAENIDAE)

By A. Steven Corbet, D.Sc., Ph.D., F.R.E.S.

Revisional papers by Fruhstorfer (1913, *Z. wiss. Insektenbiol.* **9**: 242–247; **10**: 307–310; **11**: 341–344), in which many new forms were described, formed the basis of his remarkably accurate monograph on the Indo-Australian Lycaenid genus *Miletus* Hbn. (= *Gerydus* Bsdv.) in Seitz, 1916, *Grossschmett. Erde* **9**: 815–823. The Javanese species have been listed by Toxopeus (1929, *Tijd. Ent.* **72**: 244).

Certain of the *Miletus* species exhibit so high a degree of individual and geographical variation that determination, particularly in the case of females, may be difficult. As little information is available concerning the male genitalia, the opportunity has been taken of revising the genus on this basis. It will be seen from the figures that the structure of the genitalia separates the genus into four rather well-defined groups :—

(*a*) clasper terminating in a broad lobe, with a small terminal hook; aedeagus strongly curved: *croton, gaesa, learchus, fictus, gaetulus, archilochus, boisduvali, longeana* and *biggsii*.

(*b*) clasper tapering and terminating in a broad, blunt hook; aedeagus comparatively broad and only slightly curved: *zinckenii, symethus, gigantes, ancon* and *gallus*.

(*c*) clasper narrowing gradually and terminating in a bent, rather rectangular, bifid process; aedeagus straight, rather broad and slightly tapering: *melanion*.

(*d*) clasper leaf-like, tapering towards its extremity and with lateral folding in the distal half; aedeagus almost straight, comparatively broad, and only slightly tapering at its distal end: *heracleion* and *leos*.

The synonymy of the genus appears to be as follows :—

Miletus Hübner, 1819, *Verz. bek. Schmett.*: 71. Type (cited in 1852, Doubleday, Westwood & Hewitson, *Gen. diurn. Lep.* **2**: 502) = *Papilio symethus* Cram., 1779.

Symetha Horsfield, 1828, *Descr. Cat. Lep. Mus. E. I. Co.*: 59, pl. ii, f. 2. Type = *S. pandu* Hsf., 1828 (= *P. symethus* Cram., 1779).

Gerydus Boisduval, 1836, *Spec. Gén. Lép.*, Atlas, pl. xxiii, f. 2. Type = *P. symethus* Cram., 1779.

Key for the separation of the Malaysian species of *Miletus*.

1 (6). ♂ upF vein 4 not thickened at the base.
2 (3). Up dark brown and unmarked but, occasionally, ♀ has faint indications of discal fascia on F . . . . . *gaesa*.
3. UpF with white discal area.
4 (5). UpF with a white discal band extending from costa to space 1b: very like *biggsii* but the white area in space 1b is not half as long as that in space 2 and the un markings are not outlined with whitish *fictus*.
5. UpF with white discal area extending to wing base: upH white with narrow dark brown bordering . . . . . *gaetulus*.
6. ♂ upF vein 4 thickened at the base.
7 (8). ♂ up uniform dark brown, with pale straw-coloured sex stripe along vein 4 on F. ♀ up with very diffuse discal band comprising separated straw-coloured spots arranged as in *boisduvali* ♂ . . *archilochus*.

8. UpF with a white discal band which, in some species, extends to the wing base.
9(10). UpF cell entirely brown. ♂ upF discal band narrow and diffuse, comprising separated spots in spaces 1b, 2 and 3, the last extending into space 4. ♀ upF with the outer edge of the discal band regularly curved, and convex towards the termen . . *boisduvali.*
10. UpF cell partially white.
11(14). UpF with outer edge of white discal area not right-angled at vein 3.
12(13). UpF white discal band comparatively narrow and rather lenticular. In f. *atomaria* the whole of the discal band is dark dusted . *biggsii.*
13. UpF white discal area extending to the wing base : upH dark brown *zinckenii.*
14. UpF with outer edge of white discal area right-angled at vein 3 and the white area in spaces 1b and 2 extended towards the termen.
15(18). UpF with more than half the wing area pure white.
16(17). UpH costal area dark brown and discal area whitened on a dark-grey ground . . . . . *symethus.*
17. UpH entirely white . . . . . *gigantes.*
18. UpF with the white area restricted to the discal band.
19(20). UpF white discal band almost separated into two portions by a dark wedge extending from the base into space 2 . . . . . *ancon.*
20. UpF discal band not nearly separated into two portions by a dark wedge.
21(22). UnF with the white spot in space 1b not separated from the upper portion of the discal band . . . . . *gallus.*
22. UnF with the white spot in space 1b separated from the upper portion of the discal band . . . . . *heracleion.*

Miletus gaesa gaesa (Nic.).

Gerydus gaesa de Nicéville, 1895, *J. Bombay nat. Hist. Soc.* **10** : 26, pl. S, f. 16 ♂ ; ♂♀, North-east Sumatra, Battak Mountains.
G. learchus gaesa Fruhstorfer, 1916, *in* Seitz, *Grossschmett. Erde* **9** : 816, pl. 141 f 4 ♂.

It seems probable that *M. gaesa* replaces the Philippine species *M. learchus* Feld. & Feld. in Sumatra and south-east Asia. Malayan and Sumatran forms hardly differ, but the Tonkin subspecies *gethusus* (Fruh.) has more angulated wings. The male holotype of *carrinas* (Fruh.), from Sintang, Borneo, which was described as a race of *learchus*, has been ascertained to be a form of *M. boisduvali* Moore.

Miletus fictus sp. n.

♀. The fore-wing termen is slightly sinuate and the tornus is squarer than in *M. biggsii* (Dist.) ♀, from Malaya. Hind-wing very slightly prolongated at veins 3 and 4.

Upperside. Closely resembles *biggsii* ♀, but the fore-wing white discal band is slightly broader and its outer edge is rather more circular : vein 2 is dark dusted in the outer half of the discal band giving the impression of the white spot in space 1b being almost separated. This white area in space 1b is hardly half as long as that in space 2 (the corresponding white area in *biggsii* is as long as that in the space above). Cilia as in *biggsii* ♀.

Underside. Pale rusty brown (not greyish buff as in *biggsii*), with the fore-wing white area broader than above and its outer edge very evenly rounded. The fore-wing markings, arranged as in *biggsii*, are almost obsolete, except for the buff brown bar at the cell-end :

the ground colour is darker reddish-brown between the discal band and the termen on the fore-wing and in the tornal third of the hind-wing. The hind-wing markings as in *biggsii*, those in the basal half of the wing fainter, and the post-discal fascia broader and comprising broader contiguous spots, the irregular triangular spot in space 7 being isolated. An important distinction between this species and *biggsii* is that the underside markings are not outlined with whitish. *Cilia* rich rusty red on both wings. Underside of thorax and abdomen and colour of legs more rusty red than in *biggsii*.

Wing expanse 37·5 mm.

Holotype. Malay Peninsula: Pahang, Fraser's Hill, 3500 feet, 5.xi.1936 (*J. N. Eliot*). In British Museum.

♂. The fore-wing apex is more acute and the termen is straighter than in *biggsii* ♂ from Malaya. Vein 4 of the fore-wing is not thickened at its origin. The hind-wing is evenly rounded.

On both surfaces the colour, pattern and markings resemble those of the female, except that the colouring is paler, but it is suspected that this may be due to fading. Genitalia as shown in fig. 4.

Wing expanse 38 mm.

Allotype. Malay Peninsula: Pahang, Fraser's Hill, 4250 feet, 4.iii.1930 (*A. S. Corbet*). In my collection. This species is known to me only from the two specimens described. The left hind-wing of the male is damaged and, as Mr. J. N. Eliot had generously presented his specimen to the National Collection, it appeared preferable to make the female the holotype.

Miletus gaetulus (Nic.).

Gerydus gaetulus de Nicéville, 1894, *J. Asiat. Soc. Bengal* **63**: 24, pl. v, f. 12 ♀; North-east Sumatra, Battak Mountains.
G. gaetulus Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9**: 820.

The species was recorded from Malaya by Evans (1933, *J.F.M.S. Mus.* **17**: 408), but I have seen no Malayan specimens. Subspecies from Kina Balu and Nias have been described as *innocens* (H. H. Drc.) and *aphylis* (Fruh.) [1] respectively; specimens from South-east Sumatra have a narrower hind-wing margin than in the nominotypical form.

Miletus archilochus kelantanus (Cbt.).

Gerydus archilochus Fruhstorfer, 1913, *Z. wiss. Insektenbiol.* **9**: 246; ♂♀, Tonkin. Figured in Seitz, pl. 141 b 4 ♂ und., 5 ♀.
Miletus ar. kelantanus Corbet, 1938, *J.F.M.S. Mus.* **18**: 248; ♂♀, Malay Peninsula, Kelantan.

This rare species is known only from a few specimens from Indo-China and North Malaya. A Selangor Museum male from Peninsular Siam (Trang, 30.iv.1924, *I. H. N. Evans*) is not separable from *kelantanus*.

Malayan *M. archilochus* and *M. gaesa* (Nic.) are very similar, but the former is larger and, on the underside, the fore-wing cell-end stripe is narrower and the outer bar in space 7 on the hind-wing is nearer the bar in space 6 than the middle bar in space 7: in *M. gaesa* the outer bar in space 7 is midway between the other two.

[1] The female allotype of *aphylis* has the genital armature from a male attached to the abdomen.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

Miletus boisduvali xeragis (Fruh.).

Miletus boisduvali Moore, 1857, in Horsfield and Moore, *Cat. Lep. Mus. E. I. Co.* **1** : 19, pl. 1a f. 1 ♀; Java.
Gerydus boisduvali xeragis Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 818; ♀, Singapore.

This variable species, which occurs from India and China to New Guinea, is remarkable for the almost total disappearance of the fore-wing white markings in some localities: some Bornean males of *M. boisduvali*, for example, hardly differ from *M. gaesa*, except in the small sex stripe on the fore-wing.

Other Malaysian races of *M. boisduvali* are *hyllus* (Fruh.) Sumatra, *vincula* (H. H. Drc.) North Borneo, *heraeon* (Fruh.) (= *carrinas* (Fruh.)) Sintang, West Borneo, *simalurensis* (Tox.) Simalur, and *oxylus* (Fruh.) Bawean. The nominotypical form is figured in Seitz, pl. 141 e 3 ♀, and in Piepers and Snellen, pl. xix, f. 10a ♂, b ♀, and the Sikkimese race *milvius* (Fruh.) in Seitz, pl. 141 f 5 ♀.

The Burmese species *M. croton* (Doh.) and *M. longeana* (Nic.) approach *M. boisduvali*, but in both the outer edge of the fore-wing discal band is more arcuate. The male sex stripe is absent from *M. croton* (of which the Annamese race *mallus* (Fruh.) is figured in Seitz, pl. 141 f 1 ♂), but is present in *M. longeana*, in which the hind-wing discal area is broadly whitened and the fore-wing white discal band is often extended towards the wing base. I have failed to recognise *M. courvoisieri* (Fruh.), from Java, stated to differ from *M. boisduvali* in the more rounded wings and lighter underside.

Miletus biggsii biggsii (Dist.).

Gerydus biggsii Distant, 1884, *Rhop. Malay.* : 206, pl. xxii, f. 12 ♀; ♀♂, Malay Peninsula.
G. gopara de Nicéville, 1890, *Butt. India, Burmah, Ceylon* **3** : 25; ♂, Perak.
G. biggsi biggsi f. *atomaria* Fruhstorfer, 1913, *Z. wiss. Insektenbiol.* **10** : 307; ♂, Rhio Archipelago.
G. biggsi biggsi f. *denticulata* Fruhstorfer, 1913, *Z. wiss. Insektenbiol.* **10** : 307; ♂♀, North-east Sumatra.
G. biggsi biggsi Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 819, pl. 141 g 1 ♂, 2 ♀.
G. biggsi biggsi f. *atomaria* Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 819.
G. biggsi biggsi f. *denticulata* Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 819.

This species, which extends from Burma, throughout Malaysia, to the Philippines, is subject to a high degree of individual and geographical variation. Some Malayan females are liable to be confused with that sex of *M. boisduvali xeragis* (Fruh.).

The form *denticulata* comprises specimens with dentated hind-wings, while in form *atomaria*, which has been taken in Singapore, the rather restricted white discal band on the fore-wing is dark dusted in a manner recalling *M. boisduvali*: unlike this species, however, the pale spots in spaces 1b and 2 on

FIGS. 1–19.—Male uncus plate, aedeagus and clasper of: (1) *Miletus croton shania* (Evans) (North Shan States); (2) *M. gaesa gaesa* (Nic.) (Sumatra); (3) *M. learchus learchus* Feld. & Feld. (Luzon); (4) *M. fictus* sp. n. (Malaya) allotype; (5) *M. archilochus kelantanus* (Cbt.) (Malaya) holotype; (6) *M. boisduvali assamensis* (Doh.) (Burma); (7) *M. boisduvali heraeon* (Fruh.) (holotype of *carrinas* (Fruh.)) (West Borneo); (8) *M. longeana* (Nic.) (Burma); (9) *M. biggsii biggsii* (Dist.) (Malaya); (10) *M. gaetulus* (Nic.) ssp. (South-east Sumatra); (11) *M. zinckenii valens* (Fruh.) (West Sumatra); (12) *M. symethus symethus* (Cram.) (Java); (13) *M. gigantes* (Nic.) (North-east Sumatra); (14) *M. ancon ancon* (Doh.) (Burma); (15) *M. ancon gigas* (H. H. Drc.) (Kina Balu); (16) *M. gallus* (Nic.) (Sumatra); (17) *M. heracleion* (Doh.) (Perak) holotype; (18) *M. leos teos* (Doh.) (South Flores); (19) *M. melanion vitelianus* (Fruh.) (Mindanao). All *camera lucida* drawings of the same magnification.

the fore-wing are not moved out of line with the rest of the discal band towards the termen.

An examination of the male genitalia of Malaysian *M. biggsii* has shown that the shape of the clasper is rather variable, but there are no grounds for supposing that such divergent forms as *biggsii* (Dist.), *atomaria* (Fruh.), or *cellarius* (Fruh.) are not conspecific.

Other Malaysian forms of *M. biggsii* are *nymphis* (Fruh.) West Sumatra; *cellarius* (Fruh.) Kina Balu, with remarkably broad fore-wing white bands and figured in Seitz, pl. 141 f 2 ♂, 3 ♀; *eustatius* (Fruh.) from the lowlands of North Borneo hardly differs from *cellarius*; *metrovius* (Fruh.) and *sebethus* (Fruh.) from Sandakan and South Borneo respectively are more like the nominotypical form; *natunensis* (Fruh.) Natuna Islands; *artaxatus* (Fruh.) West Java, with form *oichalia* (Fruh.) corresponding to f. *denticulata* and figured in Piepers and Snellen, pl. xix, f. 11 ♀; *extraneus* (Tox.) Pulau Weh; *niasicus* (Fruh.) Nias; *albotignula* (van Eecke) Simalur and *batunensis* (Fruh.) from Pulau Tello in the Batu Islands, off the west coast of Sumatra.

Miletus zinckenii pallaxopas (Fruh.).

Miletus zinckenii Felder & Felder, 1865, *Reise Novara Rhopal.* : 284, pl. xxxv, f. 34 ♂ und.; ♂♀, Java.
Gerydus zinckeni pallaxopas Fruhstorfer, 1913, *Z. wiss. Insektenbiol.* **10** : 307; ♂♀, Selangor.
G. zinckeni pallaxopas Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 820.

This species is confined to Malaysia, other subspecies being *valens* (Fruh.) Sumatra and *improbus* (H. H. Drc.) Kina Balu. The nominotypical form is figured in Seitz, pl. 141 e 2 ♀ and in Piepers and Snellen, pl. xix, f. 9a ♂, b ♀.

Miletus symethus diopeithes (Fruh.).

Papilio symethus Cramer, 1779, *Pap. Exot.* **2** : 84, pl. cxlix, f. B, C ♀; East Indies.
Gerydus symethus Distant, 1884, *Rhop. Malay.* : 205, pl. xx, f. 2 ♂, pl. xxii, f. 14 ♀.
G. symethus diopeithes Fruhstorfer, 1913, *Z. wiss. Insektenbiol.* **9** : 244; ♂, Rhio Archipelago, ♀, "ex museo Singapore."
G. symethus diopeithes Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 821, pl. 141 d 6 ♂.

After *M. biggsii*, *M. symethus* is probably the commonest species of the genus in Malaya. A number of Malaysian subspecies and forms have been described : *acampsis* (Fruh.) North-east Sumatra, *petronius* (Dist.) Sandakan, *hieropöus* (Fruh.) Brunei, *bangkanus* (Fruh.) Banka, *vespasianus* (Fruh.) Nias (figured in Seitz, pl. 141 d 5 ♂), *batuensis* (Fruh.) Pulau Tello and *edonus* (Fruh.) Palawan. Both Fruhstorfer and Toxopeus regarded the nominotypical form as of West Javanese origin (Seitz, pl. 141 d 7 ♂, 8 ♀ and Piepers and Snellen, pl. xix, f. 8c ♂, a ♀), and *perlucidus* (Fruh.) (P. & S., f. 8b ♂) was described from East Java. The male holotype of the form *pandu* (Hsf.) is intermediate between Piepers and Snellen's figures 8d and 8e.

Miletus gigantes (Nic.).

Gerydus gigantes de Nicéville, 1894, *J. Asiat. Soc. Bengal* **63** : 23, pl. v, f. 1 ♂, 13 ♀; North-east Sumatra, Battak Mountains.
G. gigantes Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 820, pl. 141 e 5 ♂.

In *M. gigantes*, the restricted white area on the fore-wing beneath is divided and does not extend from the cell to the inner margin as in *M. gaetulus*. The relationship between *M. gigantes* and *M. ancon* is very close, and it is only in the Malay Peninsula that both species occur.

Miletus ancon ancon (Doh.).

Gerydus ancon Doherty, 1889, *J. Asiat. Soc. Bengal* **58** : 438, pl. xxiii, f. 8 ♂; Tenasserim Valley, Tavoy District.
G. ancon ancon Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 820.

In *M. ancon* from Burma and Malaya, the fore-wing white discal band is completely divided in both sexes by a dark basal streak; in the Kina Balu representative *gigas* (H. H. Drc.) (Seitz, pl. 141 e 6 ♀), this white discal band is continuous in the male, although it is usually almost divided in the female. Although the male genitalia of *gigas* are larger and more robust than in nominotypical *ancon*, these differences are of degree rather than of kind. Fruhstorfer gave the name *anconides* to the Sarawak form of *M. ancon* described by Moulton (1912, *J. Straits Branch roy. Asiat. Soc.* **6** : 77) as being intermediate between *ancon* and *gigas*.

Miletus gallus (Nic.).

Gerydus gallus de Nicéville, 1894, *J. Asiat. Soc. Bengal* **63** : 25, pl. v, f. 11 ♀; North-east Sumatra, Battak Mountains.
G. gallus Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 820, pl. 141 e 1 und.

Although this species differs from *M. heracleion* principally in the more extensive white area on the underside of the fore-wing, the differences in the male genitalia are considerable.

Miletus heracleion (Doh.).

Gerydus heracleion Doherty, 1891, *J. Asiat. Soc. Bengal* **60** : 36; ♂, Malay Peninsula, Perak.
G. heracleion Fruhstorfer, 1916, in Seitz, *Grossschmett. Erde* **9** : 820.

This species is known to me only from the unique male holotype and a single specimen of the undescribed female.

♀. The wing shape differs from that of the male only in that veins 3 and 4 are slightly prolongated on the hind-wing.

Upperside and underside as in the male, except that, on the rather paler underside, the white area in spaces 1b and 2 is more elongated.

Wing expanse 37 mm.

Neallotype. Malay Peninsula : Perak (*W. Doherty*). In British Museum, ex Coll. Oberthür.

The British Museum (Natural History) has the types of *boisduvali* Mre., *croton* Doh., *pandu* Hsf., *shania* Evans and *vincula* H. H. Drc., and all the *Miletus* forms described by Fruhstorfer which are mentioned in this paper except *anconides*, *courvoisieri*, *hieropöus* and *natunensis*, and I am indebted to the Trustees of the Museum for permission to study their collections.

Book Notice.

Danmarks Fauna. Biller [Coleoptera] X. Malacodermata, Fossipedes, Macrodactylia og Brachymera. [By] V. Hansen. Larverne ved S. G. Larsson. København (G. E. C. Gads Forlag). pp. 320, 96 + 101 figs. Price 9.00 Kronor. 1938.

This handy-sized book forms one of the well-known *Danmarks Fauna* series and is the 10th volume devoted to the beetles.

It is divided in two parts; the first (pages 1–192) is concerned with imagos and is written by V. Hansen, and the second (pages 193–320) with larvae and is written by S. G. Larsson. In each part there is a series of keys of families, genera and species, and each species is dealt with separately; all available information is given. A very high percentage of species is illustrated by original figures.

The treatment of the second part follows the pattern of the first.

Book Notice.

Index V to the literature of American Economic Entomology. January 1, 1930 *to December* 31, 1934. Compiled by Mabel Colcord. Edited by E. P. Felt. College Park, Md. (American Association of Economic Entomologists). Special Publication No. 5. pp. [x] + 693. (Printed in double column.)

This volume is a continuation of Indexes I–IV, a series which continues the earlier bibliographies of Henshaw and Banks, and the whole represents a unique index to national literature on Economic Entomology.

The production of literature on this subject in America is so great that a complete index to it is necessarily of value to readers other than those interested solely in American Economic Entomology.

In form the book is one alphabetical index arranged by subjects. The list of subject headings is exhaustive and many cross references are given. A series of symbols denotes newly described insects, whether an article or book is illustrated, or that some presumably less important references have been deleted by the editor. This last has been done in an attempt to keep the publication within the bounds of usefulness. It does not appear that the completeness of the book has suffered as a result.